CLAIMS

1. A β1,3-N-acetyl-D-galactosamine transferase protein which transfers N-acetyl-D-galactosamine to N-acetyl-D-glucosamine with β1,3 linkage.

2. The glycosyltransferase protein according to claim 1, which has at least one of the following properties (a) to (c):

(a) acceptor substrate specificity

when using an oligosaccharide as an acceptor substrate, the protein shows transferase activity toward Bz-β-GlcNAc, GlcNAc-β1-4-GlcNAc-β-Bz, Gal-β1-3-(GlcNAc-β1-6) GalNAc-α-pNp, GlcNAc-β1-3-GalNAc-α-pNp and GlcNAc-β1-6-GalNAc-α-pNp ("GlcNAc" represents an N-acetyl-D-glucosamine residue, "GalNAc" represents an N-acetyl-D-galactosamine residue, "Bz" represents a benzyl group, "pNp" represents a p-nitrophenyl group, and "-" represents a glycosidic linkage. Numbers in these formulae each represent the carbon number in the sugar ring where a glycosidic linkage is present, and "α" and "β" represent anomers of the glycosidic linkage at the 1-position of the sugar ring. An anomer whose positional relationship with CH_2OH or CH_3 at the 5-position is *trans* and *cis* is represented by "α" and "β", respectively);

(b) reaction pH

the activity is lower in a pH range of 6.2 to 6.6 than in other pH ranges; or

(c) divalent ion requirement

although the activity is enhanced at least in the presence of Mn^{2+}, Co^{2+} or Mg^{2+}, the Mn^{2+}-induced enhancement of the activity is almost completely eliminated in the presence of Cu^{+}.

3. A glycosyltransferase protein which comprises the following polypeptide (A) or (B):

(A) a polypeptide which has the amino acid sequence shown in SEQ ID NO: 2 or 4; or

(B) a polypeptide which has an amino acid sequence with substitution, deletion or insertion of one or more amino acids in the amino acid sequence shown in SEQ ID NO: 2 or 4 and which transfers N-acetyl-D-galactosamine to N-acetyl-D-glucosamine with β1,3 linkage.

4. The glycosyltransferase protein according to claim 3, wherein the polypeptide (A) consists of a polypeptide having an amino acid sequence covering amino acids 189 to 500 shown in SEQ ID NO: 2.

5. The glycosyltransferase protein according to claim 3, wherein the polypeptide (A) consists of a polypeptide having an amino acid sequence covering amino acids 36 to 500 shown in SEQ ID NO: 2.

6. The glycosyltransferase protein according to claim 3, which consists of a polypeptide having an amino acid sequence sharing at least more than 30% identity with an amino acid sequence covering amino acids 189 to 500 shown in SEQ ID NO: 2 or amino acids 35 to 504 shown in SEQ ID NO: 4.

7. A nucleic acid consisting of a nucleotide sequence

encoding the polypeptide according to any one of claims 3 to 6 or a nucleotide sequence complementary thereto.

8. The nucleic acid according to claim 7, which consists of the nucleotide sequence shown in SEQ ID NO: 1 or 3 or a nucleotide sequence complementary to at least one of them.

9. The nucleic acid according to claim 7, which consists of a nucleotide sequence covering nucleotides 565 to 1503 shown in SEQ ID NO: 1 or a nucleotide sequence complementary thereto.

10. The nucleic acid according to claim 7, which consists of a nucleotide sequence covering nucleotides 106 to 1503 shown in SEQ ID NO: 1 or a nucleotide sequence complementary thereto.

11. The nucleic acid according to claim 7, which consists of a nucleotide sequence covering nucleotides 103 to 1512 shown in SEQ ID NO: 3 or a nucleotide sequence complementary thereto.

12. The nucleic acid according to any one of claims 7 to 11, which is DNA.

13. A vector carrying the nucleic acid according to any one of claims 7 to 12.

14. A transformant containing the vector according to claim 13.

15. A method for producing a β1,3-N-acetyl-D-galactosamine transferase protein, which comprises growing the transformant according to claim 14 to express the glycosyltransferase protein and collecting the glycosyltransferase protein from the transformant.

16. An antibody recognizing the β1,3-N-acetyl-D-galactosamine transferase protein according to any one of claims 1 to 6.